



American foulbrood (*Paenibacillus larvae*)

What is American foulbrood?

American foulbrood is a disease caused by the bacterium *Paenibacillus larvae*. American foulbrood (AFB) was first recorded in New Zealand in 1877 and is present in almost all countries where honey bees are found. The Chatham Islands are the only significant bee population in New Zealand that remains free from AFB.

AFB is caused when young larvae are fed spores of the bacterium, which then germinate and multiply rapidly in the tissues of the larvae, generating billions of new spores. Death then typically happens at the pupal stage.

AFB is serious brood disease that produces very tough spores that can survive for decades. Once a colony is infected, it will never recover. Moreover, there is no legal nor effective cure for AFB in New Zealand. Destruction is the only option because of how infectious the disease is, and how resistant the spores are. New Zealand is one of the few countries with a nationwide control programme to eliminate AFB from the country.

What should beekeepers look for?

Brood combs should be thoroughly inspected for AFB at regular intervals. AFB can occur in hives at any time of the year, so it is important beekeepers remain vigilant.

Symptoms can include cell cappings that are sunken, perforated, darkened, or greasy-looking, as well as irregular brood pattern in advanced infections. Look closely, as early infections may only have one or two cells showing symptoms.

Larvae infected with AFB generally die once the cell is capped over, decomposing into a brown gooey mass. Beekeepers need to uncap suspicious cells and investigate them. Beekeepers can do a 'ropiness test' by thrusting a matchstick into the cell, and if semi-fluid larval remains can be drawn out in a thread, then it may indicate that the hive is infected with AFB. If larvae or pupae have been dead for a month or longer before discovery, they will dry to a dark 'scale' which is very difficult to remove from the cell. Beekeepers should be very familiar with the signs of AFB and can seek guidance from the AFB Management Agency if they need extra support.

If you are unsure of whether your hive has been affected by AFB then it is best to make contact with the AFB Management Agency and they can provide assistance with identification: 0800 AFB PMP (0800 232 767) or www.afb.org.nz



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What can it be confused with?

AFB may be confused with sacbrood virus, or Parasitic Mite Syndrome (a condition caused by *Varroa destructor*). AFB may also be confused with the exotic organism *Melissococcus plutonius* (European Foulbrood).

How does it spread?

AFB is mostly spread by shifting infected hive components, but it can also be spread to a lesser degree by drifting bees, swarms, absconding, and robbing behaviours. The transport and movement of hives, packaged bees and queen bees can also spread AFB.

The spores of *P. larvae* are very resistant to drying out and can survive in honey or on hive equipment for decades. Beekeepers should avoid feeding bees honey if the exact source is unknown. It is safest to assume that used-beekeeping equipment is contaminated, unless evidence can be produced that it is clear of AFB spores.

How can beekeepers protect their hives from American foulbrood?

Once a colony is infected with AFB it is guaranteed to die, there is no cure and hygienic behaviours from the adult bees only spreads the infection within the colony. The only way to protect a hive is for beekeepers to take care to not introduce AFB into their own colonies, and to ensure that any new cases they find are spotted early and dealt with quickly before the AFB spreads to other colonies. New Zealand beekeepers have legal obligations (National American Foulbrood Pest Management Plan Order 1998) that they must meet to control and prevent AFB spread. Following these measures, as well as implementing good biosecurity practice, is the best way to protect your hives, these include:

- Registering all beehive(s) with the AFB Management Agency
- Being familiar with AFB symptoms and routinely inspecting your beehive(s) for AFB
- Undertaking an AFB Recognition Course or regular refresher courses
- When AFB is found, report positive cases to the Management Agency within seven days of becoming aware
- All equipment, products and bees associated with the positive case of AFB must be destroyed within seven days
- Do not feed drugs or substances that mask, obscure, or conceal the symptoms of AFB
- Do not deal with or transfer ownership of bees or material associated with a case of AFB
- If you do not hold a Disease Elimination Conformity Agreement (DECA), you must ensure that your hives are inspected for AFB by an approved DECA beekeeper by the 30 November each year
- All beekeepers must complete an Annual Disease Return (ADR) by 1 June each year
- Keep your bees on moveable frames to allow for inspection
- Mark all apiaries with your beekeeper registration code

Biosecurity (National American Foulbrood Pest Management Plan) Order 1998

The primary objective of the National American Foulbrood Pest Management Plan (NPMP) is to manage AFB to reduce the incidence of American foulbrood by an average of 5% each year.

The secondary objectives of the NPMP are:

- to locate all places where beehives are situated and ensure that each honey bee colony is inspected at least once every year for AFB; and
- to identify AFB cases in beehives; and
- to eliminate AFB in beehives by destroying any cases and associated bee products and destroying or sterilising associated appliances

Under the NPMP, beekeepers are responsible for eliminating AFB from their beehives. The cumulative effect of all beekeepers eliminating AFB from their beehives is the elimination of clinical AFB from managed colonies in New Zealand.

The NPMP specifies obligations for all beekeepers in New Zealand through rules and provides the opportunity to make a greater commitment to AFB elimination through entering into a Disease Elimination Conformity Agreement (DECA) with the American Foulbrood Pest Management Agency.

The Management Agency is responsible for monitoring and auditing beekeeper compliance with NPMP rules and the AFB elimination performance of beekeepers who have entered into a Disease Elimination Conformity Agreement with the Management Agency. The NPMP provides the Management Agency with legal powers to enforce the implementation of the NPMP

Further Reading

Biosecurity (National American Foulbrood Pest Management Plan) Order 1998. Retrieved from <https://www.legislation.govt.nz/regulation/public/1998/0260/latest/DLM258695.html>

CABI Invasive Species Compendium. American foulbrood. Retrieved from <https://www.cabi.org/isc/datasheet/78183#4D5586F1-E28F-4AB1-938B-17C59BE8742F>

Goodwin, R M. (1999). Elimination of American Foulbrood Disease without the use of drugs. New Zealand Ministry of Agriculture and Forestry.